

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/JP2004/008185

International filing date (day/month/year)
04.06.2004

Priority date (day/month/year)
04.06.2003

International Patent Classification (IPC) or both national classification and IPC
F02D41/00, F02D13/02

Applicant
TOYOTA JIDOSHA KABUSHIKI KAISHA

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☒ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/JP2004/008185

Box No. II Priority

1. ☒ The following document has not been furnished:

☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).

☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|-----|
| Novelty (N) | Yes: Claims | 1-7 |
| | No: Claims | |
| Inventive step (IS) | Yes: Claims | 1-7 |
| | No: Claims | |
| Industrial applicability (IA) | Yes: Claims | 1-7 |
| | No: Claims | |

2. Citations and explanations

see separate sheet

Box No. VI Certain documents cited

1. Certain published documents (Rules 43*bis*.1 and 70.10)

and / or

2. Non-written disclosures (Rules 43*bis*.1 and 70.9)

see form 210

Re Item V.

- 1 The following documents are referred to in this communication:
D1 : EP 0 737 799 A (TOYOTA MOTOR CO LTD) 16 October 1996 (1996-10-16)
- 2 Document D1, which is considered to represent the most relevant state of the art, discloses (the references in parenthesis applying to this document):
An apparatus for controlling valve actuation in internal combustion engines, which controls the valve actuation for intake and exhaust valve to be corresponding predetermined target valve actuation, with
 - a first computation means wherein a target for a first valve and a target overlap amount is computed, and wherein a second target valve actuation is computed based on the computed targets of the first valve and the target valve overlap
 - or in an alternative embodiment a second computation means, where the target valve actuations of intake and exhaust valve are computed (column 25, lines 3-10).
- 2.1 From this, the subject-matter of independent claim 1 differs in that a selection means is introduced, that "... selects ... one of the computation result of the first computation means and the computation result of the second means according to the operation state of the engine". The second computation means is selected when the load is above a predetermined value.
- 2.2 The subject-matter of claim 1 is therefore novel (Article 33(2) PCT)
The problem to be solved by the present invention may be regarded as:
The provision of an optimal transient control of a combustion engine in every engine operation state.
- 2.3 The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:
A selection means enabling to select between either a direct control of the valve overlap or the independent control of both valve timings is not known from any of the other cited documents.

3 INDEPENDENT CLAIMS 2, 4, 5 und 7

- 3.1** The subject-matter of claims 2, 4, 5 and 7 is also inventive (Article 33(3) PCT) as these claims recite also two computation means and a selection means, as discussed in paragraph 2.1.

4 DEPENDENT CLAIMS 3 and 6

- 4.1** Both dependent claims are inventive (Article 33(3) PCT) as well, as they depend on novel independent claims 2 and 5.

5 CONCISENESS

- 5.1** Claims 1,2,4,5 and 7 have been drafted as separate independent claims in the same category. This gives rise to a lack of conciseness and a failure to meet the requirements of Article 6 PCT.